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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,320	03/26/2004	Shinji Tani	3083-004	1359

33432 7590 06/27/2007

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400 HOLIDAY COURT
SUITE 102
WARRENTON, VA 20186

EXAMINER	
LAFOND, RONALD D	

ART UNIT	PAPER NUMBER
1709	

MAIL DATE	DELIVERY MODE
06/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/811,320	TANI ET AL.	
	Examiner	Art Unit	
	Ronald D. Lafond	1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19-40* is/are pending in the application.

4a) Of the above claim(s) *22-40* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/14/2004, 07/19/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 19 – 21, drawn to a coating method involving rotary supersonic atomization, classified in class 427, subclass 421.1.

II. Claims 22 and 23, drawn to a coating method involving hydraulic or spray-type supersonic atomization, classified in class 427, subclass 421.1.

III. Claims 24 – 27, drawn to a third coating method involving supersonic atomization, classified in class 427, subclass 421.1.

IV. Claims 28 – 34, drawn to a rotary supersonic atomizer, classified in class 118, subclass 300.

V. Claims 35 – 38, drawn to a supersonic atomizer, classified in class 118, subclass 300.

VI. Claims 39 and 40, drawn to a hydraulic or spray-type supersonic atomizer, classified in class 118, subclass 300.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I, II, and III are directed to related processes. The related inventions are distinct if the (1) the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect; (2) the inventions do not overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants. See MPEP § 806.05(j). In the instant case, the inventions as claimed have materially different modes of operation. Furthermore, the inventions as claimed do not encompass overlapping subject matter and there is nothing of record to show them to be obvious variants.

3. Inventions IV, V, and VI are directed to related apparatuses. The related inventions are distinct if the (1) the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect; (2) the inventions do not overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants. See MPEP § 806.05(j). In the instant case, the inventions as claimed have materially different designs. Furthermore, the inventions as

claimed do not encompass overlapping subject matter and there is nothing of record to show them to be obvious variants.

4. Inventions (I and IV), (II and VI), and (III and V) are related as process (e.g., I) and apparatus for practice (e.g., IV). The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the apparatuses claimed can also be used to produce mists for watering crops.

5. Inventions (V or VI) and I are directed to an unrelated product and process. Product and process inventions are unrelated if it can be shown that the product cannot be used in, or made by, the process. See MPEP § 802.01 and § 806.06. In the instant case, a supersonic atomizer as claimed in Group V or a hydraulic or spray-type supersonic atomizer as claimed in Group VI cannot be used to perform a coating method that involves supersonic atomization as claimed in Group I.

6. Inventions (IV or V) and II are directed to an unrelated product and process. Product and process inventions are unrelated if it can be shown that the product cannot be used in, or made by, the process. See MPEP § 802.01 and § 806.06. In the instant case, a rotary supersonic atomizer as claimed in Group IV or a supersonic atomizer as claimed in Group V cannot be used to perform a coating method that involves supersonic atomization as claimed in Group II.

7. Inventions (IV or VI) and III are directed to an unrelated product and process. Product and process inventions are unrelated if it can be shown that the product cannot be used in, or made by, the process. See MPEP § 802.01 and § 806.06. In the instant case, a rotary supersonic atomizer as claimed in Group IV or a hydraulic or spray-type supersonic atomizer as claimed in Group VI cannot be used to perform a coating method that involves supersonic atomization as claimed in Group III.

8. Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

(a) the inventions have acquired a separate status in the art in view of their different classification;

(b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;

(c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention.**

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

9. During telephone conversations with Luke Kilyk on April 3, April 5, and April 9, 2007, a provisional election was made with traverse to prosecute the invention of Invention I, claims 19-21. Affirmation of this election must be made by applicant in replying to this Office action. Claims 22 – 40 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

10. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 19 – 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruffa (United States Patent 6,503,580) in view of Kerner, et al (United States Patent 3,908,904, hereafter Kerner), and further in view of Ishikawa, et al (United States Patent 4,79,622, hereafter Ishikawa).

14. Regarding Claim 19, Ruffa teaches a coating method which exerts supersonic vibration forward (see Column 2, lines 58 – 62, Column 4, lines 2 – 14, and Claim 1) but does not explicitly teach the use of an atomizer for this purpose or the use of a rotary head spattering mechanism. However, Ruffa does teach, at Column 4, lines 3 – 5, that "in addition to being applied by spraying, the paint may also be applied by brush, roller, electro-deposition or by any other conventional way," and, at Column 2, lines 58 – 62, that "this invention consists of a high power, high frequency (e.g., ultrasonic) acoustic source that is close to or even attached to the spray gun or paint can. The resulting acoustic field will act to quickly

minimize the unevenness, or the gradient of the thickness, of the paint layer." Therefore, Ruffa is implicitly teaching that the use of acoustic/sonic vibration in combination with normal spattering or spraying methods is known in the art.

15. Kerner teaches a method of using an atomizer which includes a rotary head driven to rotate by a drive source and exerting supersonic vibration forward, comprising: supplying a material from a material source through a supply passage to the rotary head under rotation (see Column 7, lines 26 – 36); centrifugally spattering the coating material radially outwardly from the rotary head (see Column 7, lines 43 – 48); and atomizing the coating material spattered from the rotary head radially outwardly by imparting supersonic vibration (see Column 7, lines 46 – 51). Kerner teaches, at Column 2, lines 60 – 68, that "the frequency of the ultrasonic field is suitably between 10 and 1000 kHz, especially between 20 and 100 kHz. Due to atomization ... droplets are obtained in the range of between 1 and 200 μ, especially between 50 and 80 μ. Accordingly, by means of the ultrasonic atomization of this invention, droplet sizes can be obtained which are considerably smaller." Furthermore, Kerner teaches, at Column 3, lines 3 –14, that "in accordance with the preferred embodiment of this invention, the pressure or rotary atomizer is accommodated in a central cavity of the ultrasound generator, wherein the nozzle of the pressure atomizer or the centrifugal edge of the rotary atomizer is arranged in the end surface area of the ultrasound generator. Due to the construction of the ultrasound generator in the form of a hollow cylinder, in the interior of which is the pressure or rotary atomizer, an optimum utilization of the ultrasonic field is achieved for the fine atomization, and a compact atomizer construction ... results therefrom." Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have utilized the combined rotary head/ultrasonic nebulizer as taught by Kerner in the acoustically enhanced coating method taught by Ruffa with a reasonable expectation of success, because Ruffa teaches that the use of acoustic fields for the improvement of coating quality is known in the art and because Kerner teaches the advantages of reducing droplet sizes in a mist that can be obtained by using a combined rotary head and ultrasonic field.

16. Regarding Claim 19, Ruffa in view of Kerner does not teach the method wherein the atomizer includes an annular vibration plane located around the rotary head and exerting supersonic vibration forward, comprising atomizing the coating material by orienting the coating material forward while the

coating material moves radially outwardly along the vibration plane. However, as discussed, Kerner does teach (at Column 3, lines 3 – 14) that it is known to radially spatter material outwardly via a rotary head and to then further atomize this material using ultrasonic vibrations. Because Kerner also teaches, at Column 3, lines 27 – 30, that "the nebulization is attained, without the aid of an atomizing gas, solely by the rapid introduction of the pre-atomized [material] into the ultrasonic field," Kerner is implicitly allowing any device capable of providing an annular ultrasonic field that surrounds the rotary head in the central cavity. Ishikawa teaches just such a limitation (see Abstract), "an ultrasonic atomizing apparatus including an ultrasonic vibration generator and an ultrasonic vibrator horn having a cylindrical section connected at one end to the ultrasonic vibration generator and having a flared portion connected to the other end of the cylindrical section." Moreover, Ishikawa states, in Column 8, lines 22 – 32, that "In operation, the ultrasonic vibration generating means is driven to produce ultrasonic waves, which are transmitted to the ultrasonic vibrator horn ... while liquid material is supplied from the liquid material supply means to the vibrator horn to flow down the horn to the atomizing region thereof where the liquid material is atomized by the ultrasonic vibrations transmitted to the horn and the atomized droplets are thrown out from the atomizing region." Ishikawa also teaches, at Column 8, lines 60 – 64, that "according to the present invention, a hollow recess or cavity is formed in the vibrator horn, said recess opening towards the enlarged tip end of the horn and extending axially through the flared portion," and, at Column 15, lines 46 – 50, that "typically, the liquid supply means includes one or more nozzles ..." Finally, Ishikawa teaches, at Column 19, lines 41 – 59, that "the present invention may suitably be used with various ultrasonic atomizing apparatus which atomize the liquid materials by the use of ultrasonic vibration. More particularly, the present invention, ... may effectively be used with ... industrial liquid atomizers such as ... spray coating devices," and, at Column 3, lines 15 – 17, that "it is another object [of the invention] to provide an ultrasonic atomizing apparatus which is capable of atomizing material to droplets of a uniform and extremely fine particle size." Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the coating method taught by Ruffa in view of Kerner by using an annular ultrasonic horn as taught by Ishikawa with a reasonable expectation of success, because both Ruffa in view of Kerner and Ishikawa teach the use of annular ultrasonic fields used to atomize liquids supplied to the field from a material supply means located in the annular cavity,

because both Ruffa in view of Kerner and Ishikawa teach the use of such fields for the purposes of atomizing liquids to a very fine particle size, and because Ishikawa teaches that the device disclosed therein may be used in coating apparatuses.

17. Regarding Claim 20, Ishikawa teaches the method wherein the coating material is oriented forward exclusively by the supersonic vibration without the aid of air (see again Column 8, lines 22 – 32; although Ishikawa does not explicitly state this limitation, no air is used in the embodiment disclosed, and Ishikawa teaches that the material is oriented forward and that ultrasonic vibration is used).

18. Regarding Claim 21, Ishikawa teaches the method wherein the coating material moves radially outwardly while forming a thin film on the vibration plane (see Column 15, lines 46 – 66).

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald D. Lafond whose telephone number is (571) 270-1878. The examiner can normally be reached on M-F 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RDL

MICHAEL B. CLEVELAND
SUPERVISORY PATENT EXAMINER